Goldi – A Division of Astral Operations Limited

Goldi Farm Composting Site – S24G Application – draft Environmental Management Programme

Locality: Standerton

Departmental Ref No: 17/2/10/24G (GS) – 01/2013/14

Date: 17 April 2015

SHANGONI
Management Services (Pty) Ltd

DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME (EMP)

Goldi – A Division of Astral Operations Limited

Goldi Farm Composting Site – S24G Application

draft Environmental Management Programme

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Date: 17 April 2015

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Management Services (Pty) Ltd

PROJECT DETAILS

Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs

Reference No.: 17/2/10/24G (GS) – 01/2013/14

Project Title: Goldi Farm Composting Site – S24G Rectification Application

Project Number: EAR-STA-13-01-08

Compiled by: Karien du Plessis

Date: 17 April 2015

Location: Pretoria

Technical Reviewer: Lizette Crous

Signature

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LIST OF ABBREVIATIONS

BID	-	Background Information Document
BAR	-	Basic Assessment Report
CRR	-	Comments Response Report
DWA	-	Department of Water Affairs
EAP	-	Environmental Assessment Practitioner
ECA	-	Environmental Conservation Act of 1989
EIA	-	Environmental Impact Assessment
EIR	-	Environmental Impact Report
EMF	-	Environmental Management Framework
EMP	-	Environmental Management Programme
GN	-	Government Notice
I&AP	-	Interested and Affected Party
MDEDET	-	Mpumalanga Department of Economic Development, Environment and Tourism
NEMA	-	National Environmental Management Act, Act 107 of 1998, as amended
NEMWA	-	National Environmental Management: Waste Act, Act 59 of 2008, as amended
R	-	Regulation
S24G	-	Section 24 G of NEMA, 1998, as amended

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1. INTRODUCTION

Goldi is a Division of the Astral Operations Limited group. Astral is a leading poultry producer in South Africa and consists of a number of business units, including Poultry, National Chicks, Ross Poultry, Meadow Feeds, Tiger Chicks and Tiger Feeds. Goldi has three chicken abattoirs (Standerton, Camperdown and Olifantsfontein) in South African and also owns a number of chicken farms. A large number of contract growers are also employed to produce chickens for slaughter at Goldi's abattoirs (www.astralfoods.co.za).

The Goldi Farm Composting Site is located on Portion 15 of the farm Vlakfontein 388 IS. The site is approximately 2.8km North-West of Standerton, Mpumalanga.

1.1 BACKGROUND DESCRIPTION

The management of organic waste from the Goldi abattoirs, hatcheries, chickens farms, and rendering plant is problematic as these wastes need to be disposed of if they cannot be re-used, recycled or recovered. In the past, these wastes were disposed of as Goldi did not have alternative ways of managing the wastes generated. An alternative option for the management of this waste is to compost it into a valuable product.

1.2 PROJECT/ACTIVITY DESCRIPTION

The activity that was illegally commenced with entails the development and operation of a composting process that can biodegrade organic poultry waste. The waste streams comprise of poultry litter generated by Goldi broiler farms in the area, as well as a low percentage of organic matter from the Goldi hatchery, the Goldi abattoir and its rendering facility.

The method of composting is known as the Windrow composting method and involves the production of compost by piling organic matter or biodegradable waste, such as animal waste, in long rows. The rows are frequently turned and watered in order to improve porosity and oxygen content, to mix in or remove moisture and to redistribute cooler and hotter portions of the pile. Windrow composting is an effective method to produce good quality compost on a large scale.

The illegal activities were commenced with on 22 November 2012. The activities that have already been completed include:

- Approximately 13ha of old cropland has been cleared to establish a Windrow-composting process area.
- Approximately 4 500m^3 of poultry waste is currently stored onsite.
- A storm water control berm has been constructed on the Southern border of the site in order to divert affected storm water run-off from entering the adjacent earth dam.

Activities that still need to be completed:

- An evaporation pond would need to be constructed at the lowest point of the berm, in order to contain affected storm water run-off.
- Composting of approximately 11 315m^3 of poultry waste (chicken manure, chicken hatchery waste, rendering facility carcass meal sediment and abattoir and rendering facility effluent waste). Waste will be fed into the composting plant at a daily rate of 31m^3.

Figure 1 shows the locality of the site.

In accordance with Section 24(G) read together with sections 24(F) and 12(3) of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended, the applicant is required to conduct a rectification process for unlawfully commencing with the following activities:

Table 1: Unlawful activities undertaken

Number and date of the relevant notice	Activity No.	Description of activity undertaken
EIA regulations in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended		
Government Notice R544 in Government Gazette 33306 of 18 June 2010 (Listing Notice 1)	11	The construction of: (i) canals; (ii) channels; (iii) bridges; (iv) dams; (v) weirs; (vi) bulk storm water outlet structures; (vii) marinas; (viii) jetties exceeding 50 square metres in size; (ix) slipways exceeding 50 square metres in size; (x) buildings exceeding 50 square metres in size; or (xi) infrastructure or structures covering 50 square metres or more where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line. The composting site is, and the evaporation pond will be, within 32 metres of a watercourse.
Government Notice R544 in Government Gazette 33306 of 18 June 2010 (Listing Notice 1)	23(ii)	The transformation of undeveloped, vacant or derelict land to – (ii) residential, retail, commercial, recreational, industrial or institutional use, outside an urban area and where the total area to be transformed is bigger than 1 hectare but less than 20 hectares; - except where such transformation takes place - (i) for linear activities; or

Number and date of the relevant notice	Activity No.	Description of activity undertaken
		(i) for purposes of agriculture or afforestation, in which case Activity 16 of Notice No. R545 applies Approximately 13ha of previously disturbed land (outside urban area), used for crop production in the past, was used for the establishment and operation of a poultry waste composting site.
Regulations in terms of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008), as amended		
Government Notice No. 718 in Government Gazette 32368 of 3 July 2009, Category A	2	The storage including the temporary storage of hazardous waste at a facility that has the capacity to store in excess of 35m^3 of hazardous waste at any one time, excluding the storage of hazardous waste in lagoons. Approximately 4 500m^3 of poultry waste is currently stored at the composting site.
Government Notice No. 718 in Government Gazette 32368 of 3 July 2009, Category A	17	The storage, treatment or processing of animal manure at a facility with a capacity to process in excess of one ton per day. The composting of the poultry litter (chicken manure), hatchery waste, abattoir waste and rendering facility waste. Approximately 4 500m^3 of poultry waste is currently onsite for composting. Should the facility be authorised, the daily processing/composting rate will be 31m^3 of organic waste per day.
Government Notice No. 718 in Government Gazette 32368 of 3 July 2009, Category A	18	The construction of facilities for activities listed in Category A of this schedule. The construction of the above, Category A activities.
Government Notice No. 718 in Government Gazette 32368 of 3 July 2009, Category B	1	The storage including the temporary storage of hazardous waste in lagoons. The storage of contaminated stormwater runoff from the site in an evaporation pond.
Government Notice No. 718 in Government Gazette 32368 of 3 July 2009, Category B	4	The biological, physical of physic-chemical treatment of hazardous waste at a facility that has the capacity to receive in excess of 500kg of hazardous waste per day. The composting of the poultry litter, hatchery waste, abattoir waste and rendering facility waste. Approximately 4 500m^3 of poultry waste is currently onsite for composting.

Number and date of the relevant notice	Activity No.	Description of activity undertaken
		Should the facility be authorised, the daily processing/composting rate will be 31m^3 of organic waste per day.
Government Notice No. 718 in Government Gazette 32368 of 3 July 2009, Category B	5	The treatment of hazardous waste using any form of treatment regardless of the size or capacity of such a facility to treat such waste. The composting of the poultry litter, hatchery waste, abattoir waste and rendering facility waste.
Government Notice No. 718 in Government Gazette 32368 of 3 July 2009, Category B	11	The construction of facilities for activities listed in Category B of this Schedule (not is isolation to associated activity). The construction of the above, Category B activities.

2. ENVIRONMENTAL ASSESSMENT PRACTITIONER

Name of firm	Shangoni Management Services (Pty) Ltd.	
Postal address	PO Box 74726 Lynwood Ridge Pretoria 0040	
Telephone No.	(012) 807 7036	
Fax	(012) 807 1014/086 643 5360	
E-mail	lizette@shangoni.co.za	
Team of Environmental Assessment Practitioners (EAP) on project		
Name	**Qualifications**	**Responsibility**
Mr Lourens de Villiers	• MSc. Water Resource Management (UP) • BSc. (Hons) (PU for CHE) • More than 12 years' experience conducting Environmental Impact Assessments and Waste Management License Applications	Project Director
Ms Lizette Crous	• MSc Environmental Management (University of London)	EAP

	• More than 3 years' experience conducting Environmental Impact Assessments and Waste Management License Applications	
Ms Karien du Plessis	• B.Sc. (Hons) Environmental Management • Less than 1 years' experience conducting Environmental Impact Assessments and Waste Management License Applications.	EAP

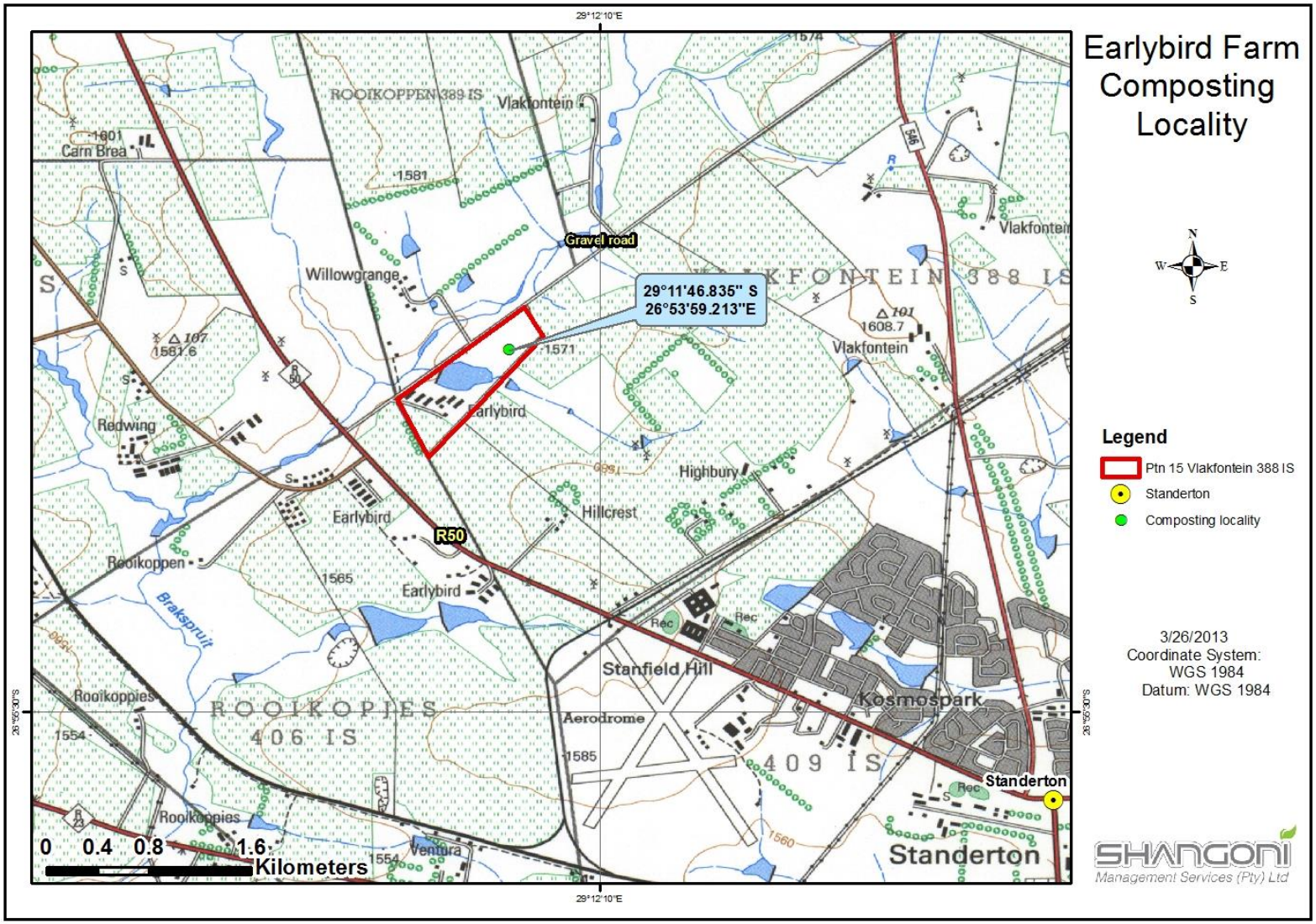

Figure 1: Locality of the Site

3. SITE DOCUMENTATION

The following documentation must be available at the site office at all times:

- A copy of the Basic Environmental Impact Assessment (BA) Report.
- A copy of this Environmental Management Programme (EMP).
- A copy of the Environmental Authorisation.

4. LEGISLATION

The table below provides an indication of the main legislation, policies and/or guidelines applicable to the Goldi Farm Composting Site project.

Table 2: Applicable legislation, policies and/or guidelines

Title of legislation, policy or guideline	Administering authority	Aim of legislation, policy or guideline
Laws of General Application		
The Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996)	-	To establish a Constitution with a Bill of Rights for the RSA.
Environment Conservation Act, 1989 (Act No. 73 of 1989 as amended)	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	To control environmental conservation.
National Environmental Management Act, 1998 (Act No. 107 of 1998)	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	To provide for the integrated management of the environment, and to regulate the 'Duty of Care' Principle.
Promotion of Access to Information Act, 2000 (Act No. 2 of 2000 as amended)	-	To give effect to the constitutional right of access to any information held by the State and any information that is held by another person and that is required for the exercise or protection of any rights.
Air Quality and Noise		
National Environmental Management: Air Quality Act (Act No. 39 of 2004)	Gert Sibande District Municipality	To reform the law regulating air quality to protect the environment by providing reasonable measures for the prevention of pollution. To provide for national norms and standards regulating air quality monitoring, management and control.
Highveld Priority Area Air Quality Management Plan	Department of Environmental Affairs	To manage and control emissions within the Highveld Priority Area

Title of legislation, policy or guideline	Administering authority	Aim of legislation, policy or guideline
Environmental Conservation Act, 1989, Noise Control Regulations in terms of Section 25 of the Environmental Conservation Act, 1989 (Act No. 73 of 1989)	Gert Sibande District Municipality	To regulate the generation of noise and its impact on the environment.
Water Management		
National Water Act (NWA), 1998 (Act No. 36 of 1998)	Department of Water Affairs	To provide for fundamental reform of the law relating to water resources.
Waste Management		
National Environmental Management: Waste Act (Act No. 59 of 2008)	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	To reform the law regulating waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation.
GNR. 926 of 29 November 2013 – National Norms and Standards for the Storage of Waste	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	To provide a uniform national approach to the management of waste storage facilities, to ensure best practice in the management of waste storage facilities and to provide minimum standards for the design and operation of new and existing waste storage facilities.
GNR. 634 of 23 August 2013 – Waste Classification and Management Regulations	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	To regulate the classification and management of waste in a manner that supports and implements the provisions of the Waste Act, to establish a mechanism and procedure for the listing of waste management activities that do not require a Waste Management Licence, to prescribe requirements for the disposal of waste to landfill, to prescribe requirements and timeframes for the management of certain wastes and to prescribe general duties of waste generators, transporters and managers.
Biodiversity		
National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004)	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	To provide for the management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act, 1998.

Title of legislation, policy or guideline	Administering authority	Aim of legislation, policy or guideline
Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)	Mpumalanga Department of Agriculture, Rural Development and Land Administration	To provide for control over the utilisation of the natural agricultural resources of South Africa in order to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invader plants.
National Veld and Forest Fire Act, 1998 (Act No. 101 of 1998)	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	To reform the law on veldt and forest fires.
Soil and Land Management		
National Environmental Management Act, 1998 (Act No. 107 of 1998). National Environmental Management Amendment Act, 2008 (Act No. 62 of 2008).	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	To provide for the integrated management of the environment and to regulate the 'Duty of Care' Principle.
Environment Conservation Act, 1989 (Act No. 73 of 1989 as amended)	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	To control environmental conservation.
Heritage and Archaeological Resources		
National Heritage Resources Act No 25 of 1999 (Act No. 25 of 1999 as amended)	South African Heritage Resources Agency	To introduce an integrated and interactive system for the management of the national heritage resources; to promote good government at all levels, and empower civil society to nurture and conserve their heritage resources so that they may be bequeathed to future generations
Protected Areas		
National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003 as amended)	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	To provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes.
Planning of New Activities		
National Environmental Management Act, 1998 (Act No. 107 of 1998)	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	To provide for the integrated management of the environment and to regulate the 'Duty of Care' Principle.

Title of legislation, policy or guideline	Administering authority	Aim of legislation, policy or guideline
EIA Regulations R 543, R 544, R 545 and R 546, dated June 2010) under the NEMA, 1998	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	To regulate and control the authorisation of certain listed activities.
Government Notice (GN) 921: "List of waste management activities that have, or are likely to have a detrimental effect on the environment", dated 2013.	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	To regulate and control the authorisation of certain waste-related listed activities.

5. ENVIRONMENTAL MANAGEMENT PROGRAMME

Refer to the tables below for the EMP. Responsibility is assigned to the relevant parties, keeping in mind that Goldi is ultimately still responsible for ensuring implementation of the EMP. The EMP must be updated should any significant changes occur to the operations with regards to the composting site.

The mitigation measures are set out in the tables below (per project phase), for the composting site.

Note: Mitigation measures, as contained in the tables below, have taken the various alternatives into consideration.

5.1 GOVERNMENT NOTICE NO R544 (LISTING NOTICE 1), ACTIVITY 11 AND 23; GOVERNMENT NOTICE NO 718 (CATEGORY A), ACTIVITY 2, 17 AND 18; GOVERNMENT NOTICE NO 718 (CATEGORY B), ACTIVITY 1, 4, 5 AND 11

5.1.1 Environment in general

Table 3: EMP: Environment in general

Activity: Operation of the composting site					
Aspect: • Lack of knowledge amongst workers and contractors in terms of how their actions may impact on the environment. • Auditing of the composting site.					
Nature and significance of environmental impact					
Impact Description	**Environmental Objective**	**Management / Mitigation / Monitoring Measures**	**Monitoring and Compliance Reporting**	**Timeframe**	**Responsibility**
Construction Phase					
As the composting facility is already operational, this phase is not applicable.	N/A				
Operational Phase					
Harm to the environment in general (this can include pollution of soil and water resources, as well as harm to employees and wasteful practices in terms of resource use and waste management).	To prevent harm to the environment by educating workers and contractors.	• All employees must receive training as part of the safety, health and environmental induction, on waste management in order to identify, prevent, minimise or manage actions or behaviours that are likely to cause adverse impacts on air, water, land, fauna and flora as a result of operational activities at the facility. • Members of staff must be trained to manage all types of wastes in accordance with the provisions of any norms and standards and legislative requirements applicable to composting facilities. • Follow-up training may be required from time to time as new employees commence work or for specific activities that may potentially impact the environment. • The facility manager is to maintain accurate records of any training undertaken. • Training is to cover all aspects of the EMP and procedures to be followed.	Goldi must verify implementation of the mitigation measures proposed in this EMP on a monthly basis	Ongoing and as soon as the site receives Environmental Authorisation	Site Manager

		• Pollution of the biological and physical environment (including habitats for animal and plant species, water resources, land, soil and air) as a result of operations within the facility must at all times be prevented or minimised.			
Non-compliance to the Environmental Management Programme and Waste Management Licence, if issued, resulting in harm to the environment in general (this can include pollution of soil and water resources, as well as harm to employees and wasteful practices in terms of resource use and waste management).	To ensure that the site is audited adequately in order to ensure compliance to the Environmental Management Programme and Waste Management Licence, if issued.	• The site must be inspected on a daily basis to ensure early detection and addressing of environmental pollution. • The relevant authority must be given access to audit or inspect the site at any time and at such a frequency as the authority may decide. • The site owner must, during the audit or inspection, make any records or documentation available to the audit or inspection team as may be required. • A record of any non-compliance findings by the relevant authority and the manner such non-compliances were addressed must be kept in a file. • Internal audits detailing environmental performance of the facility must be conducted bi-annually and official reports prepared. All internal audits must be made available to external auditors and to the relevant authority upon request. • External audits must be conducted biennially by an independent auditor and the auditor must prepare an official report documenting the audit findings. The external audit report must be submitted to the Department upon request.	Goldi must verify implementation of the mitigation measures proposed in this EMP on a monthly basis	Ongoing and as soon as the site receives Environmental Authorisation	Site Manager
Decommissioning Phase					
Closure and decommissioning of the composting facility is not anticipated for the foreseeable future. Should the facility close, a detailed closure and rehabilitation plan will be submitted to the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs for approval not more than one (1) year prior to closure of the facility. The owner of the facility, including the subsequent owner of the facility, will remain responsible for any adverse impacts on the environment, even after operations have ceased.	N/A				

5.1.2 Stormwater

Table 4: EMP- Stormwater

Activity: Rain events and rain water (storm water) flowing through the composting site.					
Aspect: "Clean" rainwater (stormwater) flowing through "dirty" areas at the composting site.					
Nature and significance of environmental impact					
Impact Description	**Environmental Objective**	**Management / Mitigation / Monitoring Measures**	**Monitoring and Compliance Reporting**	**Timeframe**	**Responsibility**
Construction Phase					
As the composting facility is already operational, this phase is not applicable.	N/A				
Operational Phase					
• Contamination of the natural "clean" habitat in the vicinity of the composting facility, including soil, surface water and groundwater pollution.	• To ensure effective storm water management and to prevent the	• The composting site must be maintained on a continuous basis and in such a manner so that runoff from the site does not come into contact with the materials	Goldi must verify implementation of the mitigation measures proposed in this EMP on a monthly basis	Ongoing and as soon as the site receives	Site Manager

• Soil erosion. • Erosion of access roads.	contamination of clean storm water runoff. • To prevent soil erosion. • To prevent erosion of access roads.	received and processed at the site, including the final product and process residuals stored at the site. • Where leachate is to be used for dust suppression, it may only be applied to areas within the facility's working surfaces, such as the material processing and storage areas. This is to ensure that leachate does not contaminate storm water runoff. • Contaminated runoff from the working surface may be sprayed over the compost to facilitate the decomposition process. • The facility must be operated in such a manner that surface water is prevented from mixing with organics received, processed and stored at the facility, including the final product. • Runoff and leachate must be diverted to a retention pond from where the affected water can be re-applied to the compost heaps. This will serve as a moisture additive to enhance the composting process. • All water that has entered the processing and storage areas, including the contaminated water, must be handled and treated as leachate. **General storm water measures** • The capacity of the proposed storm water infrastructures should accommodate at least a 1:50 year flood event. • The containment facility, channel and berms should be inspected and serviced regularly to ensure the design capacity and integrity is maintained. Storm water control measures should be kept clear of obstructions by objects as well as siltation, especially where the velocity of the runoff is induced. • Affected runoff water should be controlled and should not contaminate the natural clean habitat within the vicinity of the composing facility. • No affected water from the composting facility is allowed to spill into the clean water environment. This should be ensured through design as well as operational control measures. • Erosion prevention measures (e.g. grass, cement or rock) should be in place at all concentration points. These areas include roads, channels, berms and other infrastructure that may increase surface runoff. • Erosion of access roads should be addressed by implementing energy dissipaters to drain surface runoff away from the roads into the adjacent veldt areas. • Regular maintenance should be conducted to ensure that all infrastructures are functioning according to design capabilities. • Effective management of surface water runoff and clean/affected water separation at the composting facility will contribute to the conservation of downstream, clean water resources. • Infrastructure design recommendations and maintenance requirements in the Storm Water Management Plan should be integrated into existing operational management measures. • The storm water management measures contained in the Storm Water Management Plan Report should be prioritised to prevent damage or failures during flood events. Efficiency and practicality are key aspects of a successful storm water management plan. Good management is based on separating clean and dirty water and therefore incorporates the fundamental principle of pollution prevention. All proposed measures prioritise the use of gravity and natural drainage lines to provide cost-effective solutions with minimum maintenance		Environmental Authorisation	

		requirements. The following measures should be implemented, as shown visually in the figure below: 1. A berm has been constructed below the composting facility and acts as a clean water diversion, thereby preventing surface runoff from the composting site entering the dirty water dam between the composting facility and the chicken houses. 2, 3. A dirty water channel and a containment facility is recommended to contain effected runoff from the site. Water within the containment facility will either be left to evaporate or will be reused to wet the composting windrows. The containment facility should be constructed with a suitable lining (HDPE) to prevent seepage to groundwater. A silt trap should be installed prior to the entrance of the containment facility to prevent siltation and reduce maintenance on the facility. An expected volume of 1 070 m^3 will flow to the containment facility during a 1:50 year, 24-hour flood. A conceptual containment facility with dimensions of 24m x 24m x 2m will only accommodate a 1:50 year, 24-hour flood event and therefore any excess will overflow and will require a suitable spillway design. The containment facility should always be operated at a “low as possible” level in anticipation of rainfall events. Monitoring should be undertaken within the containment facility to assess quality and risks of discharge. Note that the location of the dirty water storage facility may require a Water Use Licence in terms of the National Water Act (Act No. 36 of 1998) with reference to the location of the waste water storage dams and waste water disposal sites in close proximity of a watercourse. 4. It is recommended that a clean water diversion berm be constructed around the perimeter of the composting activities to prevent clean runoff from flowing into the dirty area. Regular inspections should be conducted to detect and manage degradation of the berm. Vegetation growth should be encouraged to improve berm stability.			

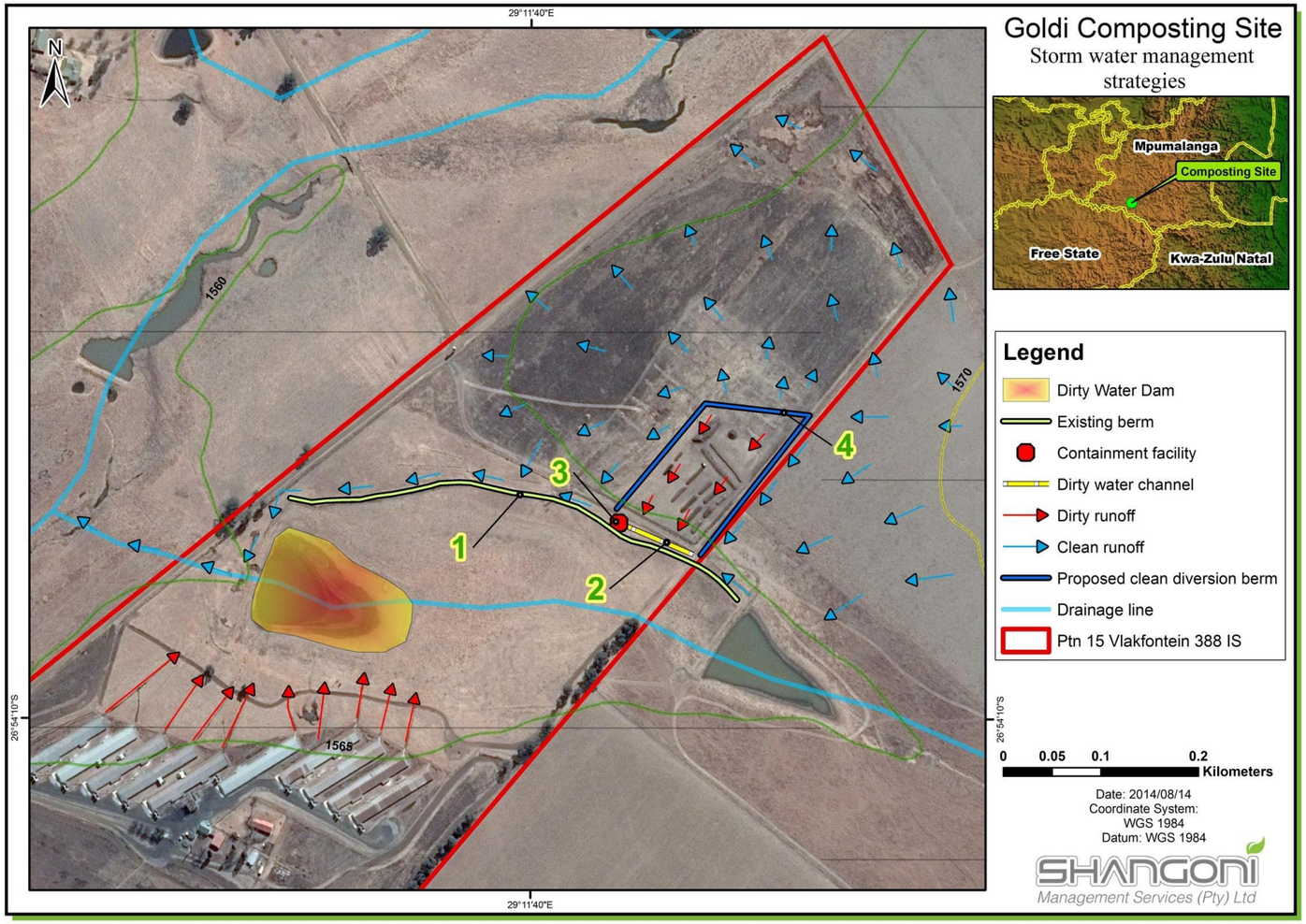

Figure 2: Proposed stormwater management measures

Decommissioning Phase	
Closure and decommissioning of the composting facility is not anticipated for the foreseeable future. Should the facility close, a detailed closure and rehabilitation plan will be submitted to the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs for approval not more than one (1) year prior to closure of the facility. The owner of the facility, including the subsequent owner of the facility, will remain responsible for any adverse impacts on the environment, even after operations have ceased.	N/A

5.1.3 Geohydrology, surface water, groundwater and soil

Table 5: EMP – Geohydrology, surface water, groundwater and soil

Activity: Operation of the composting site.					
Aspect: • Leaching of water during rain events or if the moisture content of the compost heaps is too high resulting in excess liquid draining away. • Surface water runoff during rain events. • Poor waste management. • Unsanitary conditions on site. • Poor management and spills of hazardous chemical substances including fuel, greases and oils. • Leaking and/or spilling of fuels, greases and oils.					
Nature and significance of environmental impact					
Impact Description	**Environmental Objective**	**Management / Mitigation / Monitoring Measures**	**Monitoring and Compliance Reporting**	**Timeframe**	**Responsibility**
Construction Phase					
As the composting facility is already operational, this phase is not applicable.	N/A				
Operational Phase					
The Phase 1 Geotechnical Site Investigation of the site found that the composting process may pose the following hydrogeological impacts: • Groundwater contamination form waste leachate; and • Pollution of surface water with waste leachate. Runoff and leaching of Nitrogen may contribute to water pollution (Peigné & Girardin, 2004). The vertical soil profile distribution comprises of surficial clayey sand of 0.14m covering black and olive coloured residual clay from dolerite between 0.6m and 1.3m thick followed, in the vicinity of the composting facility, by horizontally bedded and laminated weathered siltstone. This profile, if the moisture content is relatively high and the soils are kept form drying out will provide a virtually impervious layer between the surface activities and the bedrock. The horizontally bedded and laminated weathered siltstone is also nearly impervious to vertical water percolation due to the orientation of the beds and the silt to clay discontinuity infill due to the clayey nature of the rock.	To prevent contamination of the surface and groundwater from waste leachate from the composting facility.	• Site drainage will need to be well managed to prevent the build-up of moisture on the soil-bedrock interface, which may lead to the development of a seasonal perched water table that may eventually reach surface water courses. • The areas where the compostable material will be stored and processed (composted) as well as the storage areas for the final product must be compacted to ensure that the drainage onsite is poor to impervious, to prevent leachate from percolating into the ground. • Bulking agents enhance the compost's water-holding capacity and thereby reduce leachate loss (Ulén, 1993). • Reduce the amount of water percolating through the compost by covering the compost piles using, for example, a straw or tarpaulin cover (Ulén, 1993). • Regular turning of the windrows will reduce the moisture content by bringing wetter material to the surface where it can dry (Hao & Benke, 2008). • According to results from the geotechnical assessment of the site, the site soils are not necessarily suitable for use as construction materials. All infrastructure will need special attention to prevent damage due to seasonal soil volume changes in the active clay horizons covering the entire site. This includes special foundations for surface structures and the removal and replacement of clay with inert materials at road constructions.	Goldi must verify implementation of the mitigation measures proposed in this EMP on a monthly basis	Ongoing and as soon as the site receives Environmental Authorisation	Site Manager
Erosion of soil at the composting site.	To prevent erosion of the soil due to the composting and related activities, especially when surface runoff water is concentrated.	• It is the responsibility of the applicant to ensure that storm water control measures are designed and constructed to be capable of withstanding the maximum design flood. It should be taken into consideration that the potential for erosion increases where the surface runoff is concentrated and must be addressed within the	Goldi must verify implementation of the mitigation measures proposed in this EMP on a monthly basis	Ongoing and as soon as the site receives	Site Manager

		designs. Designs should incorporate gradual drainage to avoid siltation of storm water infrastructure. • Protect all areas susceptible to erosion and ensure that there is no undue soil erosion resultant from the composting and related activities.		Environmental Authorisation	
Soil, surface water and groundwater pollution. Nuisance caused by odours and unsightly appearance of waste onsite. If the incoming waste is not well managed, it may contaminate soil and water resources. The waste can produce contaminants such as pathogens, excess nutrients, veterinary pharmaceuticals, heavy metals, VOCs, antibiotics, bioaerosols and particulate matter into the air compartment. There is also a risk of zoonotic transmission and ill-health to humans (Humane Society International, 2013).	To prevent soil, surface and groundwater pollution and nuisance as a result of poor waste management (waste generated at the facility and incoming organic waste to be processed at the composting facility).	• No waste water from the composting site may be discharged or allowed to run into the environment surrounding the site or into any drainage lines or other water systems. • A material-screening system must be put in place to prevent non-permissible waste from entering the facility. Non-permissible waste must be intercepted and diverted to a relevant waste disposal facility. • All incoming compostable organic waste must be accurately weighed upon entering the composting facility and accurate records of all measured weights must be kept at the facility. • Any solid or liquid waste generated at the facility, including contaminated products and process residuals that cannot be processed at the facility must be stored in such a manner as to prevent water pollution and amenity impacts, following the requirements of the National Norms and Standards for the Storage of Waste (GNR. 926 of 29 November 2013). • The waste must be sorted at source into various categories (recyclables and non-recyclables) and a document procedure must be implemented to prevent the mixing of general and hazardous waste. • The waste must be managed in terms of an approved integrated waste management plan or Industry Waste Management Plan, if available. • Liquid waste must be stored in leak resistant containers which must be inspected weekly for early detection of leaks. The containers must be of sufficient strength and structural integrity to ensure that they are unlikely to burst or leak in their ordinary use. • Waste that is spilled or blown by the wind during operation, handling or storage must be contained. • Hazardous waste must be stored in covered containers that are only opened when waste is added or emptied. • The quantities of incoming and processed organics must not exceed the design requirements of the storage and processing areas. • Operational measures must minimise contamination of final products to the lowest practicable levels. • Records of the quantities of incoming organics and of processed organic/mature compost stored at the facility or leaving the facility must be kept. • Waste streams must not be mixed. General waste must be disposed of at a general waste management site and hazardous waste material must be disposed of at a hazardous waste disposal or handling facility. • Non-recyclable waste must be stored in containers designed for such waste and must be disposed of at a licenced waste disposal or handling facility. • A certificate of compliance with relevant SANS standards regarding the installation of waste storage containers must be kept in a file and made available to the relevant authority on request. • All organic compost intended for use as fertilisers must be registered with the DAFF and meet all the necessary requirements as per the Regulations Regarding	Goldi must verify implementation of the mitigation measures proposed in this EMP on a monthly basis	Ongoing and as soon as the site receives Environmental Authorisation	Site Manager

		Fertilisers (GNR 732 of 10 September 2012) issued in terms of the Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No. 36 of 1947), including any other amended version(s) thereof. • Safe disposal certificates for hazardous waste removed from site must be kept on record at the site. • The hazardous waste storage area must be registered with the competent authority. • The waste storage facility must have correct access control and signage as stipulated in GNR. 926 of 29 November 2013. • The waste storage facility must be operated as stipulated in GNR. 926 of 29 November 2013. • All waste storage containers must comply with the conditions as stipulated in GNR. 926 of 29 November 2013. • Training must be provided continuously to employees working with waste. The training programme must include the provisions stipulated in GNR. 926 of 29 November 2013. • An Emergency Preparedness Plan must be compiled in accordance with GNR. 926 of 29 November 2013. • Monitoring, auditing, reporting and record keeping must be conducted in accordance with GNR. 926 of 29 November 2013. • Implement a waste management plan/procedure. • The waste management plan/procedure should consider the type of waste, description, source, storage, disposal method, disposal facility and responsible person. • The implementation of the waste management plan/procedure should ensure: ▪ Installation of sufficient waste bins, skips or bulk containers, where necessary. The design of the bins, skips or bulk containers must ensure containment to prevent seepage, must be covered to prevent water ingress and must be placed on impermeable surfaces within bunded areas. ▪ All containers (bins, skips or bulk containers) shall be kept in a clean and hygienic manner. ▪ Containers (bins, skips or bulk containers) utilised for the disposal of general and hazardous waste must be demarcated accordingly. ▪ Waste material may only be temporarily stored at areas demarcated for such storage. ▪ General waste shall be stored in a manner that prevents the harbouring of pests. ▪ General and hazardous waste should always be stored and disposed of separately. ▪ General and hazardous waste should be disposed of in appropriately demarcated bins. Bins are then emptied into appropriately demarcated skips or bulk containers once a day or more often, if required. ▪ Skips or bulk containers should be removed to a nearby landfill site on a regular basis. No build-up of waste is permitted onsite. ▪ Safe disposal certificates should be requested from general and hazardous landfill sites with every waste disposal. Waste may only be disposed of at landfill in accordance with the Norms and Standards for Disposal to Landfill as stipulated in Section 7(1) of the NEMWA, 2008.			

		▪ These safe disposal certificates should be kept on file to illustrate compliance with the cradle to grave principle. • All waste generated at the facility must be classified in terms of GNR. 634 of 23 August 2013 (National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008): Waste Classification and Management Regulations). • Safety data sheets must be obtained or prepared for all hazardous waste as stipulated in GNR. 634 of 23 August 2013. • All waste storage containers must be labelled, as stipulated in GNR. 634 of 23 August 2013. • Detailed records must be kept of all waste generated, as stipulated in GNR. 634 of 23 August 2013. This includes the classification of the waste, quantities of waste generated and re-used, recycled, recovered, treated or disposed of (in tons or m^3 per month), and by whom the waste was managed. • Waste manifest documents must be compiled for all hazardous waste generated onsite, as stipulated in GNR. 634 of 23 August 2013 (specifically Annexure 2). • All waste transporters must also complete waste manifest documents for each load of waste transported, as stipulated in GNR. 634 of 23 August 2013 (specifically Annexure 2). • Waste manifest documentation must be retained for a period of at least five (5) years. • No incineration of any kind of waste will be permitted onsite. • Implement a surface- and groundwater monitoring programme. • Undertake regular geohydrological studies to determine the impact of the composting facility on the groundwater resource. • Regular review of the monitoring programme by a competent person to identify areas of improvement as well as areas that require attention.			
Soil, surface water and groundwater pollution.	Prevent soil, surface and groundwater pollution from unsanitary conditions onsite.	• Sufficient ablution facilities shall be provided – minimum of 1 toilet per 15 workers. • Ablution facilities shall be inspected and maintained to prevent and minimise blockage and leakages. • Ablution facilities are to be serviced weekly or more frequently if required. • Toilets should have properly closing doors and be supplied with toilet paper. • Awareness of the importance of proper hygiene should be created among employees. • Ablating anywhere other than in the toilets shall not be allowed. • A septic tank system should be considered instead of french drains. • Routine maintenance must be undertaken. • Implement a surface- and groundwater monitoring programme. • Undertake regular geohydrological studies to determine the impact of the composting facility on the groundwater resource. • Regular review of the monitoring programme by a competent person to identify areas of improvement as well as areas that require attention.	Goldi must verify implementation of the mitigation measures proposed in this EMP on a monthly basis	Ongoing and as soon as the site receives Environmental Authorisation	Site Manager
Soil, surface water and groundwater pollution.	To prevent and minimise soil and water pollution as a result of poor management and accidental spills of hazardous chemical substances, including fuel, greases and oils used onsite, and leaking equipment and vehicles.	• Identify all chemical substances used onsite including fuel, greases, detergents etc. • Material Safety Data Sheets for all chemical products must be kept on site in an easily accessible location to employees.	Goldi must verify implementation of the mitigation measures proposed in this EMP on a monthly basis	Ongoing and as soon as the site receives Environmental Authorisation	Site Manager

		• Ensure that the material safety data sheets have sufficient information to enable the user to take the necessary measures to protect his/her health and safety and that of the environment. • Develop and implement a dangerous goods management plan based on the material safety data sheets of all identified chemical substances and the 1995 Hazardous Chemical Substances Regulations in terms of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993). • Keep a stock inventory register of all chemicals in the store. • Powders must be stored above liquids. • Proper storage of chemicals in a lockable, well ventilated building. • Ensure adequate access control for the storage area. • Storage areas for hazardous chemicals are to comply with standard fire safety regulations. • Safety signage including “No Smoking”, “No Naked Lights” and “Danger”, and product identification signs, are to be clearly displayed in areas housing chemicals. • Appropriate equipment to deal with emergency spill incidents is to be readily available on site. This includes fire extinguishers, spill kits for hydrocarbon spills, drip trays for equipment and/or machinery leaks, drums or containers for contaminated water. • Chemicals are to be properly labelled and handled in a safety conscious manner. • All personnel handling hazardous chemicals and hazardous materials are to be issued with the appropriate Personal Protective Equipment (PPE). • Ensure that diesel or fuel tanks are in a bunded area with capacity of holding 110% of the total storage volume. • The removal of only the daily-required amount of chemicals to be used from the shed. • If refuelling on site or from drums, the ground must be protected and proper dispensing equipment is to be used i.e. hand pumps and funnels. Drums may not be tipped to dispense fuel. • Use of drip trays during filling of machinery or equipment. Drip trays should be emptied into secondary containers on a regular basis. • Ensure that any spilled chemical cannot exit the designated storage area by constructing a berm or bump at the exit, or store chemicals in a spill tray. • Immediately clean all spillage of fuels, lubricants and other petroleum based products. • The contaminated material must be disposed of in accordance with the waste management procedure. • No hazardous chemical must be discarded in the sewage or stormwater system. • Train staff on the use of chemicals in accordance with the risks as described in the material data sheets. • Implement a surface- and groundwater monitoring programme. • Undertake regular geohydrological studies to determine the impact of the composting facility on the groundwater resource. • Regular review of the monitoring programme by a competent person to identify areas of improvement as well as areas that require attention. • Inspection and maintenance of equipment and vehicles owned by Goldi shall take place on a regular basis.			

		• Security shall inspect vehicles on entering the facility to ensure vehicles are in sound condition. This will reduce the risk of oil or diesel spillages. • Equipment and vehicles are to be repaired immediately upon developing leaks. • Drip trays shall be supplied for all repair work undertaken on machinery on site. • Drip trays are to be utilised during daily greasing and re-fuelling of machinery and to contain incidental spills and pollutants. • Drip trays are to be inspected daily for leaks and effectiveness and emptied when necessary. This is to be closely monitored during rain events to prevent overflow. • Soil contaminated with hazardous substances, fuel or oil shall be treated as hazardous waste and removed from site. • All liquid fuels (petrol and diesel) are to be stored in tanks or containers with lids. • Onsite fuelling and servicing of equipment and motor vehicles may only occur in a designated area. A motor vehicle requiring maintenance must be removed from the site and repaired at a garage or service workshop.			
Decommissioning Phase					
Closure and decommissioning of the composting facility is not anticipated for the foreseeable future. Should the facility close, a detailed closure and rehabilitation plan will be submitted to the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs for approval not more than one (1) year prior to closure of the facility. The owner of the facility, including the subsequent owner of the facility, will remain responsible for any adverse impacts on the environment, even after operations have ceased.	N/A				

5.1.4 Fauna, Flora and Wetlands

Table 6: EMP – Fauna, Flora and Wetlands

Activity: Operation of the composting site.					
Aspect: • Establishment and potential expansion of the composting site. • Poor veld management.					
Nature and significance of environmental impact					
Impact Description	**Environmental Objective**	**Management / Mitigation / Monitoring Measures**	**Monitoring and Compliance Reporting**	**Timeframe**	**Responsibility**
Construction Phase					
As the composting facility is already operational, this phase is not applicable.	N/A				
Operational Phase					
An assessment of the ecological consequences of the composting facility on vertebrates found the following:	To prevent pollution and eutrophication of the waterways in the vicinity of the composting site, i.e. the dammed drainage	• It is suggested that the compost heaps are regularly monitored to ensure their prerequisite microbial health and to ensure that seepage from the compost heaps are properly controlled and ecologically benign.	Goldi must verify implementation of the mitigation measures proposed in this EMP on a monthly basis	Ongoing and as soon as the site receives	Site Manager

• The site is too small and too homogenous to be ecologically capable of supporting genetically viable vertebrate populations. It is furthermore agricultural land and was used for growing maize until recently. It is currently fallow. Since cessation of maize production, regeneration of basal cover has not been managed. As a consequence, noxious weeds such as cosmos, blackjacks and khaki weeds are rife. The substrate consists of heavy clay that, when dry, is unyielding for burrowing species. • The conservation status of the site is ranked as "Zero", or very little more than that. • Ecological damage on the site is a historical event and another agricultural application (the composting) will not detract from or improve its conservation ranking. However, the site is on the upper edge of a gradient towards a dammed seasonal drainage line. Although the dam wall is broken, the reservoir still holds sufficient water to attract water birds such as sacred ibises, flamingos, geese, ducks and cormorants. • Downstream of this dam the drainage line flows into the perennial Brakspruit that is flagged as being ecologically sensitive. The risk (*albeit* small) of noxious fluids from the compost heaps contaminating the Brakspruit requires management to prevent pollution and eutrophication of the waterways. This is considered a significant risk given the high clay content of the soils on site, which will provide little absorption of any runoff from the manure stored on site. • It is understood that efficient composting does not leach hazardous exudates, and so scientifically optimised composting procedures should thus be a first level of risk management to avoid contamination of the Brakspruit. As a second level of risk management, it is suggested that the existing furrow between the proposed site and the dam be adapted as a trap and attenuation sump for possible contaminates as a precaution against excessive runoff. The dam itself, especially if its wall is repaired, could be developed as a final, third level of risk management. • From a vertebrate perspective, no reasonable objection can be raised to a switch in land-use practice from maize production to the efficient disposal of a waste product arising from the mass production of broiler chickens.	line to the south of the site as well as the Brakspruit downstream of the dam.	• It is suggested that the furrow between the composting site and the dam downslope from the site be adapted as a trap and attenuation sump for possible contaminates as a precaution against excessive runoff.		Environmental Authorisation	

A flora assessment of the composting site found the following: Illegal commencement of activities: On site: The vegetation on site, as well as around most of the site, were in a degraded state prior to the commencement of the composting activities. No plants of conservation concern were observed on the site and it is highly unlikely that these plants persist here. Therefore, the commencement of the composting activities had no negative, direct impacts on the vegetation on the site or its immediate surroundings. Moist grasslands and Brakspruit north of the site: The current composting activities did not have any impacts on the moist grasslands north of the site. Moist grassland south and south-west of the site: The site slopes southwards and water runoff from the composting area flows towards the dammed wetlands south and south-west of the composting site. The vegetation here is not in a natural state and no plants of conservation concern were observed. The composting activities had no direct impact on off-site moist grasslands. However, it is likely that the water separation management system (drainage channel and berm) that formed part of the composting activities, had some impact on the hydrology of the moist grassland. This could be confirmed by a wetland specialist or hydrologist. Wetlands and riparian areas, such as the Brakspruit, are protected by national legislation and must be regarded as sensitive, no-go areas. Therefore, no on-site activities are allowed to impact on these off-site areas. Operation of the composting facility The continuation of the composting activities on site, as well as the potential expansion of the activities to the remainder of the site, are not considered to have a detrimental impact on the vegetation of the site or immediate surroundings. However, the composting area could have an indirect impact on the moist grasslands around the site. Polluted water reaching the moist grasslands south and south-west of the site, could possibly reach the Brakspruit. If the composting facility expands northwards on the remainder of the site, a small possibility exist that pollution could reach the Brakspruit north of the site. The Declining *Crinum bulbispermum* was confirmed to occur along the Brakspruit, about 1.2km downstream from the site, while suitable habitat also exist for the Near-Threatened *Kniphofia typhoides*. Therefore, the main concern with the continuation of the composting area would be the quality of water released into the wetland area south and south-west of the site, and subsequently the Brakspruit.		• Maintain the current fence around the composting area and prevent vehicle access to the moist grasslands south and south west of the site. • The water management system must be maintained, improved where necessary, and continuously monitored. Note that activities within 500m of a wetland area, as well as release of water into wetlands are likely subjected to a Water Use Licence (WUL). This should be clarified with a representative of the Department of Water Affairs. • Ensure that the stormwater management system is adequate in times of high rainfall and flooding. • Monitor the effectiveness of the water management system regularly. • Ensure that no polluted water reaches the Brakspruit. • No edge effect should be allowed to impact on any vegetated area, other than the site as indicated in the Fauna Assessment Report.	Goldi must verify implementation of the mitigation measures proposed in this EMP on a monthly basis	Ongoing and as soon as the site receives Environmental Authorisation	Site Manager

Loss of moist grassland and habitats for fauna species surrounding the site as a result of runaway veld fires.	To prevent the occurrence and spreading of a veld fire.	• A fire break on the inside of the boundary fence surrounding the composting site must be regularly maintained (kept free of vegetation). • Should the fire break be burnt, the provisions in terms of the National Veld and Forest Fire Act, 1998 (Act No. 101 of 1998) must be complied with.	Goldi must verify implementation of the mitigation measures proposed in this EMP on a monthly basis	Ongoing and as soon as the site receives Environmental Authorisation	Site Manager
Decommissioning Phase					
Closure and decommissioning of the composting facility is not anticipated for the foreseeable future. Should the facility close, a detailed closure and rehabilitation plan will be submitted to the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs for approval not more than one (1) year prior to closure of the facility. The owner of the facility, including the subsequent owner of the facility, will remain responsible for any adverse impacts on the environment, even after operations have ceased.	N/A				

Visual

Table 7: EMP - Visual

Activity: Operation of the composting site.					
Aspect: Existence of the site in view of receptors in the vicinity of the site, such as adjacent neighbours.					
Nature and significance of environmental impact					
Impact Description	**Environmental Objective**	**Management / Mitigation / Monitoring Measures**	**Monitoring and Compliance Reporting**	**Timeframe**	**Responsibility**
Construction Phase					
As the composting facility is already operational, this phase is not applicable.	N/A				
Operational Phase					
Negative impact on neighbours having to see the composting facility from their residences. Also, a negative impact on the neighbour's value of their properties, being within viewing distance of the composting site.	To minimise the visual impact of the composting site on receptors in the vicinity of the site.	• Operational measures must be put in place to keep the weed, pest and vermin populations as practicably low as possible. • Operational measures must be put in place to ensure that vehicles leaving the composting site do not track loose mud and litter outside the facility. • Operational procedures that minimise the generation and proliferation of windblown litter must be introduced at the composting facility. • A screen of fast growing trees must be planted along the north-western boundary of the composting site to screen the site from the adjacent land owners to the west.	Goldi must verify implementation of the mitigation measures proposed in this EMP on a monthly basis	Ongoing and as soon as the site receives Environmental Authorisation	Site Manager

		• Scrape or sweep all areas where compostable material is mixed, screened or stored on a daily basis so that minimal compostable material is visible in areas surrounding the process and storage piles.			
Decommissioning Phase					
Closure and decommissioning of the composting facility is not anticipated for the foreseeable future. Should the facility close, a detailed closure and rehabilitation plan will be submitted to the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs for approval not more than one (1) year prior to closure of the facility. The owner of the facility, including the subsequent owner of the facility, will remain responsible for any adverse impacts on the environment, even after operations have ceased.	N/A				

5.1.5 Atmosphere

Table 8: EMP – Atmosphere

Activity: Operation of the composting site.					
Aspect: • Generation of dust. • Generation of noise. • Release of odours and other atmospheric emissions.					
Nature and significance of environmental impact					
Impact Description	**Environmental Objective**	**Management / Mitigation / Monitoring Measures**	**Monitoring and Compliance Reporting**	**Timeframe**	**Responsibility**
Construction Phase					
As the composting facility is already operational, this phase is not applicable.	N/A				
Operational Phase					
Degradation of ambient air quality.	To minimise the impact of dust generated by the increased traffic frequency on the ambient air quality.	• A dustcart needs to be onsite to water down dusty roads so that the dust generation does not pose a threat to human health or the environment. • Speed bumps or traffic speed signs need to be erected to reduce speeding onsite that could result in the generation of dust. • Regular maintenance of vehicles to address wear of tires and breaks. Optimal engine combustion will allow for 'cleaner' exhaust emissions. • A complaints register must be kept onsite. The register must record the following: Date when complaint was received, name of person who reported the complaint, details of the complaint and when and how concern was addressed.	Goldi must verify implementation of the mitigation measures proposed in this EMP on a monthly basis	Ongoing and as soon as the site receives Environmental Authorisation	Site Manager
Disturbance and nuisance to neighbours due to operational activities.	To maintain a dB reading of less than 50dB at the site boundary and minimise nuisance to neighbours.	• The site workers and contractors will adhere to the requirements of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993) regarding hearing protection and noise control measures. • Regular maintenance of vehicles, back-up generators and equipment.	Goldi must verify implementation of the mitigation measures proposed in this EMP on a monthly basis	Ongoing and as soon as the site receives	Site Manager

		• All equipment and machinery should be fitted with adequate silencers. • No sound amplification equipment such as sirens, loud hailers or hooters are to be used on site except in emergencies and no amplified music is permitted on site. • If work is to be undertaken outside of normal work hours permission must be obtained from the ECO and the facility manager. • No noisy work is to be conducted over the weekends or on public holidays. • A complaints register must be kept onsite. The register must record the following: Date when complaint was received, name of person who reported the complaint, details of the complaint and when and how concern was addressed.		Environmental Authorisation	
Generation of atmospheric emissions, odours and nuisance to neighbours. Composting processes may result in significant atmospheric emissions of Ammonia (NH_3), Nitrous oxide (N_2O) and Methane (CH_4). Ammonia is the most significant emission from composting. Important factors that affect NH_3 emissions during composting is temperature, pH, aeration, the initial nitrogen content of the manure substrate and the composting process itself (Zhao *et al.*, 2008). Ammonia emissions increase exponentially during the thermophilic first phase (>45°C) and then linearly during the mesophilic final stage (25-40°C) of composting (Pagans *et al.*, 2006). High pH (>7) and aeration rate increases NH_3 volatilisation, while a high C:N ratio decreases it (Matsuda *et al.*, 2002). Once in the atmosphere, NH_3 reacts with other particles to form smog and reduces air quality (Aneja *et al.*, 2001). N_2O emissions contribute to global warming (IPCC, 2007). Atmospheric NH_3 deposition is also linked to increasing soil acidification and accelerated eutrophication of surface water (Aneja *et al.*, 2001). The final product from the process (compost) can be stored and applied to the soil with little to no odour, pathogen, weed or fly breeding potential (Zhao *et al.*, 2008).	To minimise the generation of odours at the composting facility and thus the nuisance to neighbours.	• Reasonable measures must be put in place to minimise odour emissions from odorous organic waste such as highly biodegradable organics, at the composting site. Should no effective preventative measures exist, provision must be made for the processing and storage of the waste in enclosed storage and processing facilities. • Rapidly biodegradable organics, such as organic sludge, must be covered and the quantity of this material that is exposed to the atmosphere, must be minimised. Alternatively, such organics must be stored in moisture- and vermin-proof bins that can withstand the action of organic acids. • Organics that are being processed must always be kept reasonably moist [at least 25% (m/m) moisture content] to minimise the emissions of airborne pathogens. • Emissions of biogas in aerobic processes must be controlled by keeping the organics adequately aerated. • Maintain a minimum oxygen content of at least 5%, by volume, in the free air space of every active and curing compost pile. Each compost pile must be tested at least once a week to determine the oxygen content. • Maintain the moisture content of every active and curing compost pile between 45% and 60%, by weight. The moisture content must be tested every day that the pile is turned to determine the moisture content. • Manage every active compost pile such that the initial carbon to nitrogen ratio is at least 25:1. The ideal C:N ratio is between 25:1 and 30:1. • Compost stockpiles and windrows must regularly be turned to ensure that they have sufficient moisture contents. The piles should, however, not be turned more than required, as this stimulates aerobic decomposition processes and leads to elevated NH_3 emissions (Parkinson *et al.*, 2004). • Cover all active compost piles within 3 hours of each turning with one of the following: a waterproof covering, a layer of finished compost or soil. • Cover all curing compost piles within 3 hours of each turning with one of the following: a waterproof covering, a layer of finished compost or soil. • Covering the piles has been shown to reduce air exchange and therefore NH_3 emissions (Gottschall & Vogtmann, 1988). • VOC emissions must be tested quarterly. • The quantities of incoming and processed organics must not exceed the design requirements of the storage and processing areas. • Operational measures must be put in place to ensure that the storage times for raw organics are controlled so as to minimise emissions of offensive odours. • Containers or vehicles transporting waste, including blood, to the composting facility must be leak-proof.	Goldi must verify implementation of the mitigation measures proposed in this EMP on a monthly basis	Ongoing and as soon as the site receives Environmental Authorisation	Site Manager

		• Incoming waste should be processed in a timely manner (i.e. when fresh). • An Odour Management Plan must be developed and implemented. • A complaints register must be kept onsite. The register must record the following: Date when complaint was received, name of person who reported the complaint, details of the complaint and when and how concern was addressed.			
Decommissioning Phase					
Closure and decommissioning of the composting facility is not anticipated for the foreseeable future. Should the facility close, a detailed closure and rehabilitation plan will be submitted to the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs for approval not more than one (1) year prior to closure of the facility. The owner of the facility, including the subsequent owner of the facility, will remain responsible for any adverse impacts on the environment, even after operations have ceased.	N/A				

5.1.6 Infrastructure

Table 9: EMP- Infrastructure

Activity: Increased traffic frequency on road infrastructure.					
Aspect: Wear of access roads and insufficient vehicle inspections.					
Nature and significance of environmental impact					
Impact Description	**Environmental Objective**	**Management / Mitigation / Monitoring Measures**	**Monitoring and Compliance Reporting**	**Timeframe**	**Responsibility**
Construction Phase					
As the composting facility is already operational, this phase is not applicable.	N/A				
Operational Phase					
Wear of access roads, accidents on access roads, unpermitted transport of materials and loss of materials being transported on access roads	To minimise the impact of an increase of traffic on access roads to the facility.	• Ensure that all vehicles using access roads are roadworthy. • All loads are to be securely fastened when being transported. • All vehicles are to adhere to the tonnage limitation and acquire a permit as required. • All speed limits and other traffic regulations on the public roadways must be adhered to.	Goldi must verify implementation of the mitigation measures proposed in this EMP on a monthly basis	Ongoing and as soon as the site receives Environmental Authorisation	Site Manager
Decommissioning Phase					
Closure and decommissioning of the composting facility is not anticipated for the foreseeable future. Should the facility close, a detailed closure and rehabilitation plan will be submitted to the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs for approval not more than one (1) year prior to closure of the facility. The owner of the facility, including the subsequent owner of the facility, will remain	N/A				

responsible for any adverse impacts on the environment, even after operations have ceased.	

5.1.7 Resource usage

Table 10: EMP – Resource usage

Activity: Usage of resources, such as water.					
Aspect: Inefficient and redundant use of valuable resources (such as water).					
Nature and significance of environmental impact					
Impact Description	**Environmental Objective**	**Management / Mitigation / Monitoring Measures**	**Monitoring and Compliance Reporting**	**Timeframe**	**Responsibility**
Construction Phase					
As the composting facility is already operational, this phase is not applicable.	N/A				
Operational Phase					
Wastage or depletion of valuable resources, such as water, due to inefficient or redundant usage. A water cart will be used to supply water to the composting site.	To prevent the wastage or depletion of valuable resources like water.	**General** • Ensure that all employees have been informed of the importance of natural resources (proper environmental training and awareness). • Regular site inspection by supervisors. • Inspect operations regularly to determine areas of improvement with regards to resource consumption. • Regular maintenance and inspection of equipment such as hose pipes, to prevent leaks. • Monitoring of resource consumption. • Identify areas where resource consumption can be minimised. • Set targets to try minimise resource consumption. • Identify technologies and practices that may reduce resource consumption. • Implementation of technologies and practices that can reduce resource consumption. **Water** • Running water taps and pipes may not be left unattended. • All pipe, hose and tap connections are to be fitted with correct and appropriate plumbing fittings.	Goldi must verify implementation of the mitigation measures proposed in this EMP on a monthly basis	Ongoing and as soon as the site receives Environmental Authorisation	Site Manager
Decommissioning Phase					
Closure and decommissioning of the composting facility is not anticipated for the foreseeable future. Should the facility close, a detailed closure and rehabilitation plan will be submitted to the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs for approval not more than one (1) year prior to closure of the facility. The owner of the facility, including the subsequent owner of the facility, will remain	N/A				

responsible for any adverse impacts on the environment, even after operations have ceased.	

5.1.8 Heritage

Table 11: EMP- Heritage

Activity: Operation of the composting site.					
Aspect: Disturbance of artefacts or sites of cultural heritage (archaeological and historical) significance.					
Nature and significance of environmental impact					
Impact Description	**Environmental Objective**	**Management / Mitigation / Monitoring Measures**	**Monitoring and Compliance Reporting**	**Timeframe**	**Responsibility**
Construction Phase					
As the composting facility is already operational, this phase is not applicable.	N/A				
Operational Phase					
Loss of artefacts or sites protected by the National Heritage Resources Act, 1999 (Act No. 25 of 1999).	To protect artefacts or sites of cultural heritage (archaeological and historical) significance.	• If any sites, features or objects are found during operational activities, all activities must cease and a heritage expert must be contacted to investigate the site. • No sites, features or objects may be disturbed (e.g. picked up) by employees.	Goldi must verify implementation of the mitigation measures proposed in this EMP on a monthly basis	Ongoing and as soon as the site receives Environmental Authorisation	Site Manager
Decommissioning Phase					
Closure and decommissioning of the composting facility is not anticipated for the foreseeable future. Should the facility close, a detailed closure and rehabilitation plan will be submitted to the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs for approval not more than one (1) year prior to closure of the facility. The owner of the facility, including the subsequent owner of the facility, will remain responsible for any adverse impacts on the environment, even after operations have ceased.	N/A				

5.1.9 Worker's safety and health of neighbouring residents

Table 12: EMP - Worker's safety and health of neighbouring residents

Activity: Operation of the composting site.					
Aspect: • Employees conducting work at the composting site and residents living in the vicinity of the site. • Unauthorised access to the site					
Nature and significance of environmental impact					
Impact Description	**Environmental Objective**	**Management / Mitigation / Monitoring Measures**		**Timeframe**	**Responsibility**

			Monitoring and Compliance Reporting		
Construction Phase					
As the composting facility is already operational, this phase is not applicable.	N/A				
Operational Phase					
Employees and neighbouring residents being exposed to pathogens or unhygienic conditions emanating from the composting site. Close proximity to animal wastes increases human exposure to pollutants and pathogens.	To ensure a safe working environment for employees at the composting site.	• Incoming waste should be processed in a timely manner (i.e. when fresh). • Installation of showers for all staff working on site. • Encourage workers to wash hands regularly. • Installation of rodent bait traps and flytraps.	Goldi must verify implementation of the mitigation measures proposed in this EMP on a monthly basis	Ongoing and as soon as the site receives Environmental Authorisation	Site Manager
Unsafe conditions on site in case of emergency, fire establishment and during the release of flammable gases.	To ensure safe conditions at the composting site.	• Unauthorised access to the site must be prevented, as far as practicable. • The site must be fenced off or secured to prevent unauthorised entry. • Entrance gates must be manned during operational hours and locked outside of operational hours. • Access to the premises should only be by prior arrangement. • The composting site must allow ready access to emergency response personnel and equipment. • A fire management plan or strategy must be in place, containing at least the following: ▪ Fire extinguishers that are in good working condition must be made available at the facility. ▪ Fires at the working surfaces must be extinguished immediately through for example, spreading and smothering of burning waste. ▪ Sources of fire should be identified and appropriate operational procedures be undertaken to bring the fire under control. ▪ A firebreak must be constructed around the perimeter of the site to avoid the spread of fires. ▪ Fires should not be lit on or near areas where waste is deposited. • Response measures must be put in place to deal with any eventuality of fires resulting from the working surfaces or at any other area on the site. • Emergency incidents must be dealt with in accordance with Section 30 of the National Environmental Management: Waste Act, 2008. • The design and operation of aerobic composting must ensure that methane generation is minimised. • The design and operation of aerobic composting must ensure that controls are in place for the containment, extraction and treatment of any biogas generated.	Goldi must verify implementation of the mitigation measures proposed in this EMP on a monthly basis	Ongoing and as soon as the site receives Environmental Authorisation	Site Manager
Decommissioning Phase					
Closure and decommissioning of the composting facility is not anticipated for the foreseeable future. Should the facility close, a detailed closure and rehabilitation plan will be submitted to the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs for approval not more than one	N/A				

(1) year prior to closure of the facility. The owner of the facility, including the subsequent owner of the facility, will remain responsible for any adverse impacts on the environment, even after operations have ceased.	

6. ENVIRONMENTAL AWARENESS PLAN

The following Environmental Awareness Plan must be implemented by Goldi – A division of Astral Operations Limited in order to inform their employees and contractors of the environmental risk that may result from their work. The plan must be conducted as part of the induction process for all new employees (including contractors) that will perform work in terms of the proposed activities. Proof of all training provided must be kept on-site.

The Environmental Awareness Plan is referred to as the “SHE match” training programme. The training programme focuses on the following aspects:

1. Explaining clearly what the environment is and what the environment consist of namely: air, water, soil, fauna, flora and people.
2. Once participants have grasped the description of what the environment entails, the training focuses on the potential impacts that the construction and operational activities may have on each one of these environmental components. This is done by making use of the aspect register, where each one of the environmental aspects and associated impacts has been identified.
3. To ensure that the training is effective, visual aids are used. Photos are taken of actual and potential impacts occurring on site and in some cases role-play is used to illustrate a potential impact.
4. The participants are then exposed to a poster that reflects the various environmental components. The various photos taken are posted on the poster on a rotational basis and the participants indicate (based on the visual component) what environmental component was or could have been affected by the activities portrayed on the photo.
5. By doing this the participants visualise the action as well as the potential consequence (environmental impact) of their action.
6. This general awareness training must be done before construction commences and also when new employees start work. The training should be done every two years during the Operational Phase. The poster is posted in the communal area where the impacts are visualised and the photos rotated on a monthly basis.